



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

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<b>Project Title</b> <b>The Big Clean Up</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of the project was to determine whether the height of tomato plants is significantly affected if they are grown in soil that has been restored by phytoremediation with bean, when in comparison to tomatoes grown in untreated polluted soil and those grow in untreated clean soil. Phytoremediation is a low cost natural method in which special plants, such as the bean, can clean-up contaminated soil. The hypothesis was that the height of tomato plants grown in phytoremediated (soil contaminated with used motor oil and then treated with bean plants) soil will not be significantly different than plant grown in uncontaminated soil.</p> <p><b>Methods/Materials</b> The experiment was carried out in two stages with 5 trials each. For one trial, bean plants (seeds were pre-germinated) were grown in soil with different concentrations of used motor oil (0%, 3%, 6%, and 9%). After the 16th day, bean plants were removed from the soil, and 12 tomato seeds (pre-germinated) were planted in restored soil. To act as a control, 4 other treatment groups were added, which received same concentrations of oil contamination (0%, 3%, 6%, and 9%) but were not given bean treatment (grown in restored soil). Plant height was recorded on a daily basis for each seed, bean and tomato.</p> <p><b>Results</b> The results showed that bean plant height was adversely affected as the level of oil contamination in the soil increased. For tomatoes, there was a statistically significant difference in plant height between those grown in remediated and untreated soil. There was no significant difference in plant height for tomatoes grow in treated polluted soil and those grow in uncontaminated soil.</p> <p><b>Conclusions/Discussion</b> The hypothesis was correct. Bean plants can remove enough contaminants from the soil in order to provide a healthy environment for sensitive plants, such as the tomato, to flourish. Phytoremediation can be used as a natural replacement for conventional engineering technologies for treatment of polluted soil. In comparison to man-made technologies, phytoremediation is cost-effective, avoids dramatic landscape disruption, and preserves the ecosystem.</p>	
<b>Summary Statement</b> This project determines whether the height of tomato plants grown in phytoremediated soil (cleaned by the bean) is significantly different when compared to tomatoes grown in uncontaminated soil.	
<b>Help Received</b> My father helped me with data analysis, and my brother and my mother helped me with the board.	